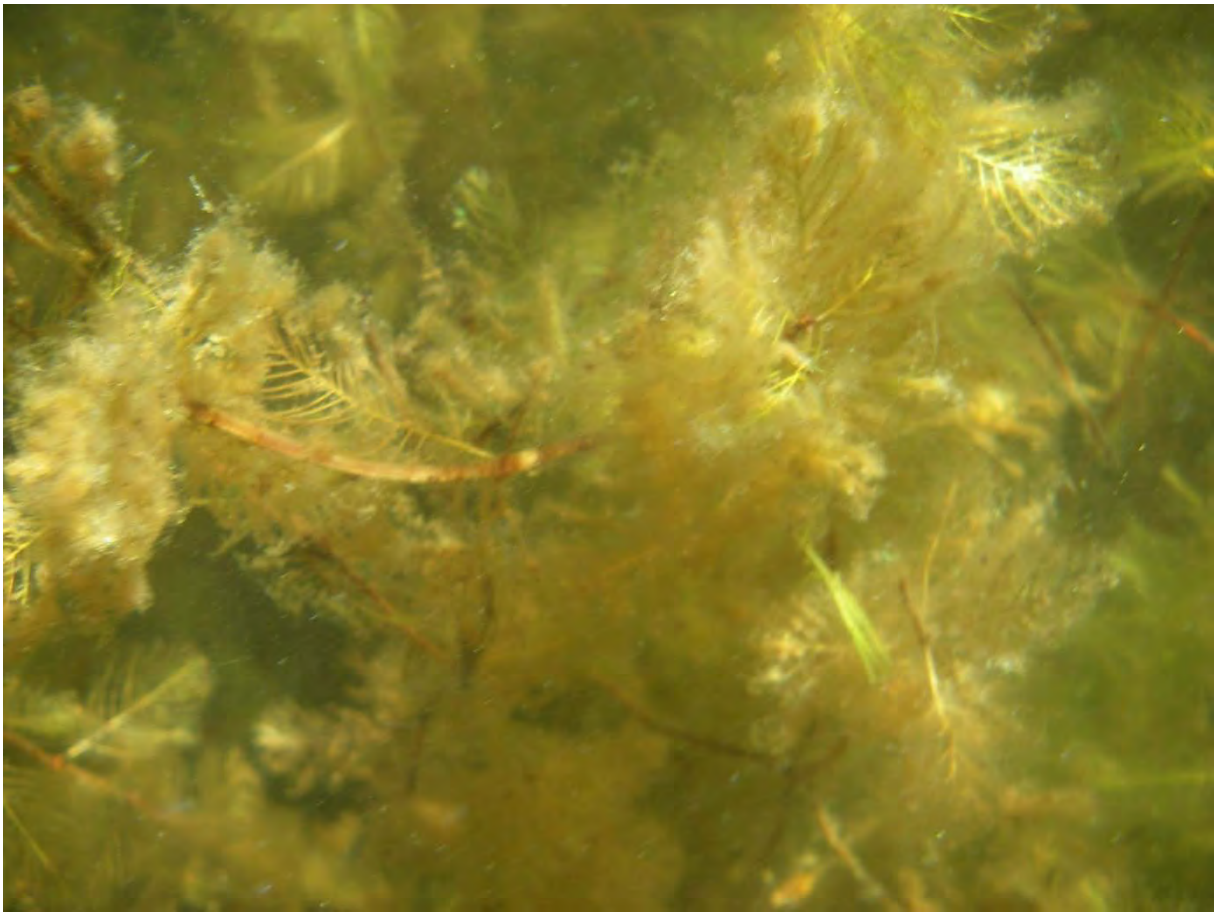
# Cottage Lake
# Aquatic Weed Management Fund Grant

**# G0800605**

**Final Project Report**




Prepared by:

King County

Department of Natural Resources and Parks

Water and Land Resources Division


December 27th, 2010

King County

# Contents

# Preparation for the grant project

Cottage Lake has been a focal point for management work for the King County Lake Stewardship Program (KCLSP) for several years. In 2004, a Centennial Clean Water Fund Grant was awarded to KCLSP to address the EPA approved phosphorus Total Maximum Daily Load (TMDL) on Cottage Lake. The work for that grant has included water quality monitoring, resident education through workshops and newsletters, and shoreline restoration projects. Part of this effort resulted in the identification of problematic noxious weeds in and around the lake. *Nymphaea odorata* (fragrant water lily) and *Lythrum salicaria*, (purple loosestrife), have long been a nuisance at the lake, and in 2006 residents along the lake raised money to hire a contractor to apply Aquamaster (active ingredient glyphosate) to the weeds with the aim of eradication.

In 2007, *Myriophillum spicatum* (Eurasian water milfoil) was identified in the lake. Eurasian milfoil may have been in the lake for some time, but populations could have been small due to shading effects created by the extensive water lily population and algae blooms. When water lily coverage decreased as a result of the control work, milfoil likely took advantage of the increased light and populations increased.

# The Lake and Aquatic Weed History

In early 2008, the Washington State Department of Ecology awarded KCLSP an early infestation grant to attempt eradication of the two acres of Eurasian milfoil present in Cottage Lake. The first treatment of Eurasian water milfoil was planned for the summer of 2008. However, the water lilies had to be treated first to insure they were gone so that the most comprehensive survey and effective treatment of milfoil was achieved.

# Project Summary by Year

## *2008*

### Milfoil

#### *Survey*

One pre-treatment survey for milfoil occurred during the 2008 growing season. The survey occurred July 7th and was a visual survey done by two King County staff members from a canoe. It was noted that milfoil was present along most of the shoreline, mostly as solitary plants that could be effectively spot treated. The north and south ends of the lake were the areas of heaviest infestation, indicating that the majority of the herbicide treatment should be focused in those areas. (See Survey maps in Appendix A)

### *Treatment*

The KCLSP staff waited until after the lily treatment done in early July before treating the milfoil infestation. On July 29th, 2008 the areas of heaviest infestation were treated with a "Granblow", which is a modified leaf blower mounted on the bow of the KCLSP boat. The herbicide of choice was Renovate OTF®, which is a flake herbicide with the active ingredient triclopyr. To perform spot treatment in the areas where only one or two plants were found, a one liter scoop was used to apply Renovate granules directly onto the plants.

Over the course of the day 14 bags of herbicide were used in the treatment, which equates to 560 lbs. The majority of the herbicide was applied in the south and north ends. The whole treatment took 4.5 hours. For treatment maps and spray reports see Appendix B.

### *Post Treatment Survey*

The second milfoil survey occurred on August 29th and again, two King County staff members performed a visual milfoil survey by canoe. The survey started at the park boat launch and went along the shoreline. Staff used a viewing tube to determine the extent of milfoil damage as a result of the first treatment. The milfoil was definitely less robust than it had been in the first survey. It was noted that many areas of heavy infestation were gone, and the plants that remained had lost many leaflets with only remnant stalks. The survey confirmed that the triclopyr had an effect on the Eurasian milfoil.

### *Herbicide Monitoring*

Tracking of triclopyr levels in the lake after the herbicide application was part of the milfoil treatment effort at Cottage Lake in 2008. FasTest samples were taken periodically (approximately a week apart) after the treatment and sent to the SePro labs. There is an irrigation restriction on using triclopyr-treated water until levels are below 1 ppb. Two weeks after the treatment, the concentrations levels had declined to 20ppb, but then remained stable until late September, when levels of 14ppb in the lake and 9ppb in the outlet creek were measured. At this point, irrigation was no longer an issue because the growing season was essentially over, and the wet season was beginning. Herbicide results can be seen in Appendix C.

## Fragrant Water Lily, Purple Loosestrife and Yellow Flag Iris

### *Treatment*

During the July milfoil survey event, spot treatment of fragrant water lily plants with Aquamaster (active ingredient glyphosate) occurred in the most heavily infested areas, particularly long the north shore and south end of the lake. The lilies were treated to uncover the most milfoil possible prior to the milfoil treatment. Lilies were treated by KCLSP staff from a canoe with a back pack sprayer. While the Ecology early infestation grant was for milfoil only, KCLSP staff performed lily treatment to ensure that the milfoil treatment was as successful as possible.

## Effectiveness of treatments

There is no clear answer for why triclopyr did not break down as quickly in the lake as the SePro company had predicted, and it was requested by the community that herbicide application rates or the timing of application to be recalibrated for the 2009 treatment season. However, the consistent and relatively high levels of triclopyr in the water column ensured the milfoil came in

contact with the herbicide, and the post treatment survey showed excellent efficacy in treating the milfoil.

The lilies became a part of the treatment strategy because in order to ensure milfoil was treatment was successful, lilies had to be controlled so milfoil could be found and treated. It was imperative to decrease the lily mats so that the Renovate OTF® flakes would be able to enter the water column and come in contact with the milfoil rather than simply rest on the fragrant water lily pads.

## *2009*

## Milfoil

### *Survey*

On July 30th, 2009, three King County staff members surveyed Cottage Lake for milfoil. Two people were in the water snorkeling while the third staff member provided assistance from the boat and took notes on findings. These positions were rotated throughout the survey.

The survey was done by snorkelers this year due to the very large patches of *Ceratophyllum demersum* (Coontail) present. Coontail is often confused with milfoil and only by removing the plant and inspecting it or by looking at it underwater can it be properly identified.

There was still quite a bit of milfoil present in the lake, but it was definitely a smaller population than in 2008. The heaviest section of infestation was in the north end. Scattered milfoil plants were found predominantly along the western shore, but a few were found along the south eastern shoreline as well. Aside from the north end, milfoil was found as individual plants or in small clumps, both which were easy to hand pull.

The surprise finding was that the south end, where the heaviest infestation was present in 2008, was not nearly as heavy in 2009. In fact, very few milfoil plants were found; however, surveying the area was difficult due to the persistent lily coverage and mud mats at the outlet. (See Appendix A for map).

### *Treatment*

The week after the July survey, the KCLSP staff returned to Cottage Lake to perform an herbicide treatment for milfoil. Both staff members are licensed aquatic herbicide applicators and performed a Renovate OTF® treatment with the active ingredient triclopyr. Basing the treatment on the 2008 results, the total amount of Renovate used was decreased to try to limit the long residence time of the herbicide.

Two areas of the lake were the focus: the north end, where the densest populations were found, and the south end, which had been the heaviest infestation in 2008 but was clearly affected by the first treatment. However, extra care was taken with the treatment in the south end, as the bottom was still obscured by dying fragrant water lilies and mud mats in the shallow areas.

Renovate OTF® was applied by using the Granblow mounted to the KCLSP boat. Treatment took approximately an hour, and excellent coverage was achieved because of the ease of access to the milfoil infestation areas and ease of application.

One of the goals of this herbicide treatment was to use less herbicide than in 2008 to get the same effective results but lower the residual herbicide levels in the lake. KCLSP was particularly sensitive about the high herbicide residence time because it was interfering with water use permits held by residents on the lake and several complaints were lodged to that effect in 2008.

### *Monitoring*

After the treatment, herbicide levels were monitored using SePro's FasTest. Samples needed to be below 1 ppb before the watering restriction could be lifted. Samples were taken every two weeks after the initial treatment in August and were taken three times after the treatment.

Two weeks after the treatment, levels were between 12 ppb and 11 ppb. The levels dropped through August and September. Although the edge of the water lilies at the south end was only sampled once, it is possible that the concentrations stayed slightly higher than at the northern stations because of the direction of flow to the lake outlet.

It did appear that herbicide levels were trending downwards by the last sampling event in September, suggesting that a level of 1 ppb would have been achieved shortly. However, sampling stopped in late September as the rainy season hit the Northwest and the need to monitor for irrigation purposes became a non-issue. (See Appendix C for results)

## Fragrant Water Lily, Purple Loosestrife and Yellow Flag Iris

### *Treatment*

The fragrant water lily project was taken over by the community. It was determined that King County no longer had the funds nor the staffing to continue treating lilies, so the community raised the funds themselves and hired a contractor to treat the lilies.

## Effectiveness of Treatment

King County LSP staff were very pleased with the overall treatment results from 2008, making it easy to survey and treat in 2009. While milfoil plants still persisted in Cottage Lake, the densities were substantially less after the initial treatment and, if given the time and staff, hand pulling could have been an effective method of control. However, from experience doing treatments on other lakes such as Spring Lake, it was determined that it would be best to continue with herbicide treatments in 2010 to ensure that all plants were treated in a cost effective manner during the life of the grant.

## *2010*

## Milfoil

### *Survey and Hand Pulling*

One mid-summer survey was done during the 2010 growing season. Three King County staff members snorkeled the entire shoreline of the lake looking for milfoil. The majority of the milfoil was found along the western shore in patches of 1 to 3 plants.

There were two larger areas of milfoil infestation, both on the north end. One patch was from the northeast corner to the beginning of the County park. The second infestation is to the west of the park and all the way to the northwest corner. (See Appendix A)

### *Treatment*

Treatment was performed on August 16th, 2010. It took an hour and 160 pounds of Renovate OTF® (active ingredient triclopyr) was sprayed in the lake by the use of a Grandblow. All areas that were identified as having milfoil were treated, which resulted in a treatment concentration of 1.0 ppm. Due to the slow degradation of the triclopyr observed in previous years, less herbicide was applied this year in hopes the herbicide levels would drop quicker.

### *Monitoring*

One water quality sample was taken two weeks after the treatment and concentrations were found at higher levels than the expected 1 ppb. Due to staffing issues at King County, this was the only water quality sample taken. It is believed that the herbicide continued to break down slowly and with the onset of fall rains reached below the targeted 1ppb.

## Fragrant Water Lily, Purple Loosestrife and Yellow Flag Iris

### *Treatment*

The fragrant water lily project was still headed up by the community. It was determined that King County no longer had the funds nor the staffing to continue treating lilies so the community raised the funds themselves and hired a contractor to treat the lilies. Scheduling was still done to make sure lily treatment occurred prior to milfoil treatment to allow milfoil in the south end to be exposed if located under the lilies.

## Effectiveness of Treatment

Milfoil has not been eradicated from Cottage Lake in 2010. The milfoil was found in smaller populations than when first identified in 2007 but was still present. The largest infestations treated in 2008, up in the north end and in the south end, have decreased significantly and in the case of the outlet area, milfoil is no longer present. Renovate OTF® seems to have a long residence time in the lake and that can account for the effectiveness in killing milfoil although makes it harder to treat early in the season due to irrigation restrictions and the unhappiness of the citizens in not having available irrigation water.

# Education and Outreach

## Community Involvement

No major community outreach was done for this early infestation grant due to the need to respond quickly to the infestation.

### *Meetings*

The Community approached King County about the identification of milfoil infestation in 2007. In December of 2007, King County did a presentation on the milfoil at the Friends of Cottage Lake general meeting. Ted Barnes, a leader in the effort at Spring Lake, also came to the December meeting to share the Spring Lake community's experience and lessons learned

All Friends of Cottage Lake general meetings allowed for milfoil and lily project updates. Meetings occurred on an annual basis and the dates were January 3rd, 2008, January 28th, 2009 and April 19th, 2010. All meeting notes can be found on the Friends of Cottage Lake website (www.friendsofcottagelake.org)

### *Online Materials*

King County stayed in touch with the President of the Friends of Cottage Lake, which maintained a web page that had up to the minute updates about surveys, treatments and herbicide monitoring. The website (http://friendsofcottagelake.org/) was sent out to all Friends of Cottage Lake members as well as the Cottage Lake Beach Club residents. It was an excellent, instant way to keep the community informed on the progress of the report.

# Overall Project Results

The effort put forward on the Eurasian milfoil through the Department of Ecology early infestation grant was definitely successful in reducing the milfoil population in Cottage Lake. When the infestation was found, it was very close to the 2 acre cut off that defines an early infestation but over the three years of treatment, the milfoil population has definitely decreased to well under an acre.

Two things that proved to be difficult from the start were the triclopyr residence time and the community's apprehension in using any other type of herbicide. At the beginning of the project, the Cottage Lake community was very wary about herbicide use. The Friends of Cottage Lake did thorough research on the different herbicides available. While the success of 2,4-D on milfoil in Spring Lake was well documented and discussed, the Cottage Lake community was adamantly opposed to the use of it in the lake because much of the literature they found about 2,4-D cited that the chemical was highly toxic both to humans and to salmon. Cottage Lake has Coho salmon present and while the community was aware of the fish windows, it was a risk they were not willing to take, especially when there were other herbicide options available. This is the main reason the Cottage Lake community picked triclopyr.

This was the first project KCLSP had ever used triclopyr for milfoil control and the largest lesson learned was that the Renovate OTF® never broke down the way the label claimed. KCLSP did the first treatment (2008) in midsummer at one of the higher label recommended percentage rates and the triclopyr levels remained incredibly high well after the label said it would break down. After this treatment, King County received complaints from the community regarding the long residence time and inability to irrigate. KCLSP took this information and pushed treatment times later in both 2009 and 2010 to allow for some irrigation during the dry summer months.

If King County decided to apply for a full Aquatic Weed Grant, there would have been more years to control the milfoil, leading to greater success but given that an early infestation could feasibly be controlled and possibly eradicated, the early infestation grant seemed to be the best option. At the end of the three years, the grant greatly helped decrease the infestation to less than an acre. In hindsight, it may have been more effective to work with the community on finding alternative water sources for irrigation and treating earlier in the growing season but treating at a lower concentration would likely have still happened due to the high residual levels found in the lake post treatment. However, Cottage Lake milfoil responded well to triclopyr and it is thought that with continued treatments Cottage Lake could be milfoil free.

# Budget

The early infestation grant from Ecology awarded King County Water and Land Resources the initial amount of $11,429 in 2008. In 2009, an amendment went through that raised the total grant award to $22,858 and extended grant work until the end of 2010. Table 1 below summarizes the estimated 2010 award and expenditures. These expenditures are estimates as the final billing will not be done until January of 2011.

**Table 1: Cottage Lake Milfoil Eradication Project final budget and billing estimate .**

Early Infestation Budget and Expenditures*

| | | Awarded | Spent |
|---|---|---|---|
| Task 1 | Project Administration | $ 2,000.00 | $ 2,780.51 |
| Task 2 | Milfoil eradication | $ 20,000.00 | $ 16,608.17 |
| Task 3 | Final Report | $ 858.00 | $ 1,249.95 |
| | Total Project | $ 22,858.00 | $ 20,638.63 |

This is an estimate of the final billing as staff time for the final report has not been posted to the King County financial system. Final billing numbers may be slightly higher or slightly lower than what is listed in the table above.

The majority of the costs went into the treatment aspect of the project, which included herbicide costs, staff time for surveying and treating, and herbicide analysis. This task represents the bulk of the work on this project and on average this task has cost approximately $6,500 per year. The KCLSP chose to internalize this project to ensure there was understanding about the extent of the milfoil infestation, as well as be in control of the survey and treatment, so it was easier to communicate with the community on the effort.

The other aspects of this project included Project Administration, which spent over the total budgeted task amount and included things such as reporting to Ecology, submitting billing and team communication. The third task will be billed in the final billing, which is for the time necessary to write the final project report. These two tasks took more time than originally anticipated when the grant contract was written.

# Proposed Management for Future Years

Friends of Cottage Lake have been managing the water lily treatment for the last several years and have done so very successfully. The community was aware of the early infestation grant project and have made efforts to ensure that they continue working toward eradication of the milfoil. The community has raised funds and worked with aquatic herbicide applicators, making the community well versed to add milfoil to their work. The community has also learned a lot about milfoil and how it is spread, creating more vigilant property owners around the lake. They have also learned how to educate others to decrease the possibility of a reinfestation.

King County KCLSP will also encourage members of Cottage Lake to become a part of the King County Lake Weed Watcher Program. Through this the residents will still have access to technical assistance through the county and become even better stewards of their unique ecosystem by identifying any further invasive weeds early.

# APPENDICIES

## Appendix A: Survey Maps

## Appendix B: Treatment Maps and Spray Reports

## Appendix C: Herbicide Monitoring Results

# APPENDIX A

# SURVEY MAPS

## 2008 Lily Location

2008 Lily location

N

0 130 260 520 Feet


## 2008 Milfoil Locations

2008 Single Milfoil Plant Locations

2008 Milfoil Areas

N

0 115 230 460 Feet


## 2009 Milfoil Locations

2009 Single Plant Locations

2009 areas of large milfoil infestation

N

0 130 260 520 Feet


**2010 Milfoil Locations**

N

0 115 230 460 Feet

# APPENDIX B

# TREATMENT MAPS AND SPRAY REPORTS

**2008 Milfoil Treatment**

2008 Hand applied

2008 Applied with Grandblow

N

0 130 260 520 Feet


**2009 Milfoil Treatment**

2009 Treatment Areas

N

0 130 260 520 Feet


2010 Milfoil Treatment
2010 Milfoil Treatment
N
0 130 260 520 Feet

# PESTICIDE APPLICATION RECORD (Version 1)

**NOTE:** This form must be completed same day as the application and it must be retained for 7 years (Ref. chapter 17.21 RCW)

*Washington State Department of Agriculture*
*Pesticide Management Division*
*PO Box 42560*
*Olympia WA 98504-2560*
*(877) 301-4555*

1. Date of Application - Year: 2008 Month: August Day: 2008 Start Time: 10 am
   Stop Time: 13:00
2. Name of person for whom the pesticide was applied: King Co. WLRD
   Firm Name (if applicable):
   Street Address: 201 S. Jackson St Ste 600 City: Sea State: WA Zip: 98104
3. Licensed Applicator's Name (if different from #2 above): Beth Cullen License No.: 66298
   Firm Name (if applicable): Tel No.:
   Street Address: City: State: Zip:
4. Name of person(s) who applied the pesticide (if different from #3 above):
   License No(s). If applicable:
5. Application Crop or Site: Fragrant water lily
6. Total Area Treated (acre, sq. ft., etc.): 4
7. Was this application made as a result of a WSDA Permit? ☐ No ☐ Yes (If yes, give Permit No.) #
8. Pesticide Information (please list all information for each pesticide, including adjuvants (buffer, surfactant, etc.), in the tank mix):

| a) Full Product Name | b) EPA Reg. No. | c) Total Amount of Pesticide Applied in Area Treated | d) Pesticide Applied/Acre (or other measure) | e) Concentration Applied |
|---|---|---|---|---|
| Aquamaster | 524-343 | 105mL | 26.25mL/acre | 1.5% |
| LI 700 | | 35mL | 8.75mL/acre | |
| | | | / | |
| | | | / | |
| | | | / | |

9. Address ***or exact location*** of application. NOTE: If the application is made to one acre or more of agricultural land, the field location must be shown on the map on page two of this form.

10. Wind direction and estimated velocity (mph) during the application:
11. Temperature during the application:
12. Apparatus license plate number (if applicable):
13. ☐ Air ☐ Ground ☐ Chemigation
14. Miscellaneous Information:

**Location of Application** (If the application covers more than one township or range, please indicate the township & range for the top left section of the map only.

Township: N

Range: ☐ E ☐ W (please indicate)

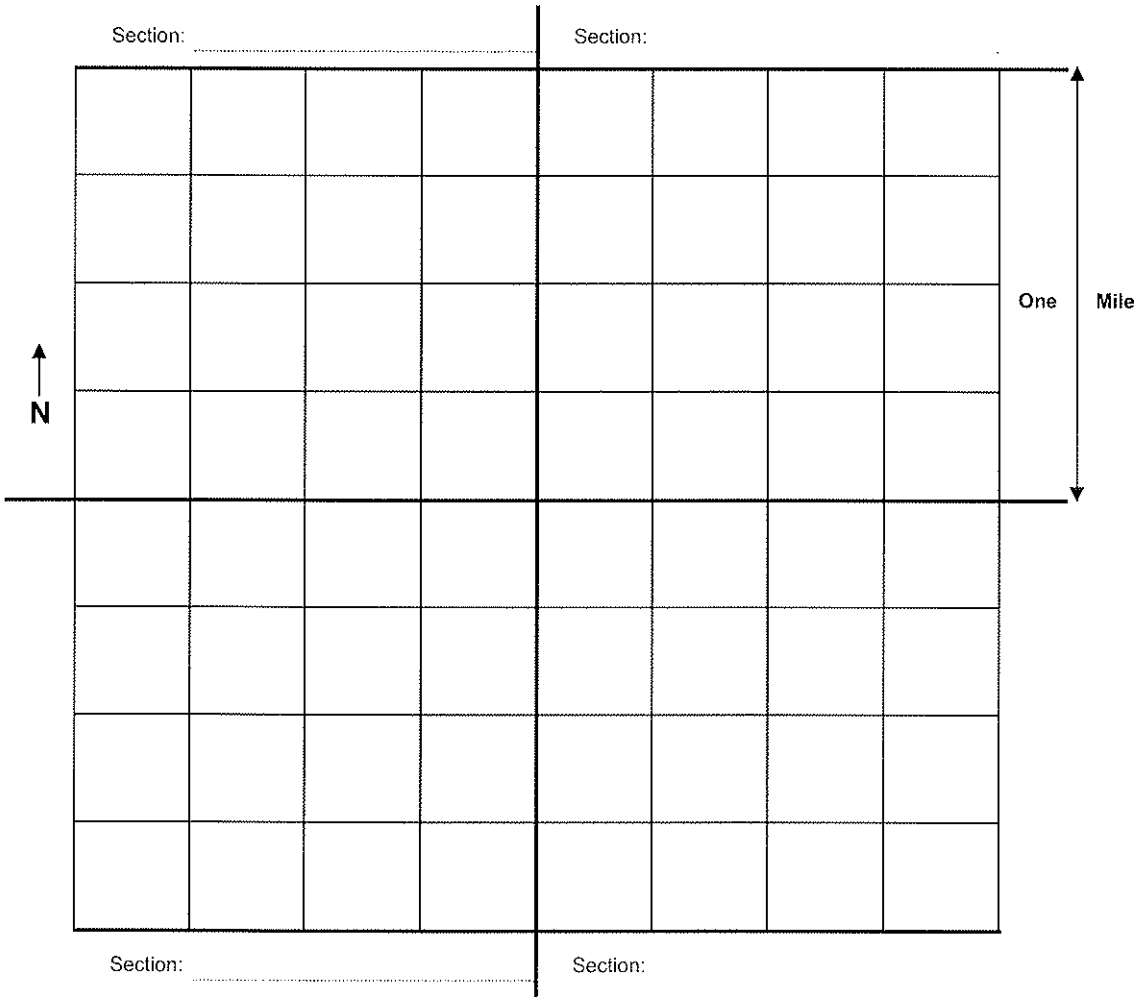
Section(s):

Block: Farm Unit:

or GPS:

County:

***PLEASE NOTE:***
*The map is divided into 4 sections with each section divided into quarter-quarter sections. Please complete it by marking the appropriate section number(s) on the map and indicate as accurately as possible the location of the area treated.*




Miscellaneous Information:

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*Washington State Department of Agriculture*
*Pesticide Management Division*
*PO Box 42560*
*Olympia WA 98504-2560*
*(877) 301-4555*

1. Date of Application - Year: 2008 Month: July Day: 7 Start Time: 10:15
   Stop Time: 15:30
2. Name of person for whom the pesticide was applied: King County WLRD
   Firm Name (if applicable):
   Street Address: 201 S. Jackson St Ste 600 City: Seattle State: WA Zip: 98104
3. Licensed Applicator's Name (if different from #2 above): Michael Murphy License No.: 74407
   Firm Name (if applicable): Tel No.:
   Street Address: City: State: Zip:
4. Name of person(s) who applied the pesticide (if different from #3 above):
   License No(s). If applicable:
5. Application Crop or Site: fragrant waterlilies
6. Total Area Treated (acre, sq. ft., etc.):
7. Was this application made as a result of a WSDA Permit? ☐ No ☐ Yes (If yes, give Permit No.) #
8. Pesticide Information (please list all information for each pesticide, including adjuvants (buffer, surfactant, etc.), in the tank mix):

| a) Full Product Name | b) EPA Reg. No. | c) Total Amount of Pesticide Applied in Area Treated | d) Pesticide Applied/Acre (or other measure) | e) Concentration Applied |
|---|---|---|---|---|
| Aquamaster | 524-343 | 1650 mL | 253 mL / acre | 1.5% |
| LI 700 | | 550 mL | 91.6mL / acre | |
| | | | / | |
| | | | / | |
| | | | / | |

9. Address ***or exact location*** of application. NOTE: If the application is made to one acre or more of agricultural land, the field location must be shown on the map on page two of this form.

10. Wind direction and estimated velocity (mph) during the application: <3mph
11. Temperature during the application: 71°F
12. Apparatus license plate number (if applicable):
13. ☐ Air ☐ Ground ☐ Chemigation
14. Miscellaneous Information:

**Location of Application** (If the application covers more than one township or range, please indicate the township & range for the top left section of the map only.

Township: ..... N

Range: ..... ☐ E ☐ W (please indicate)

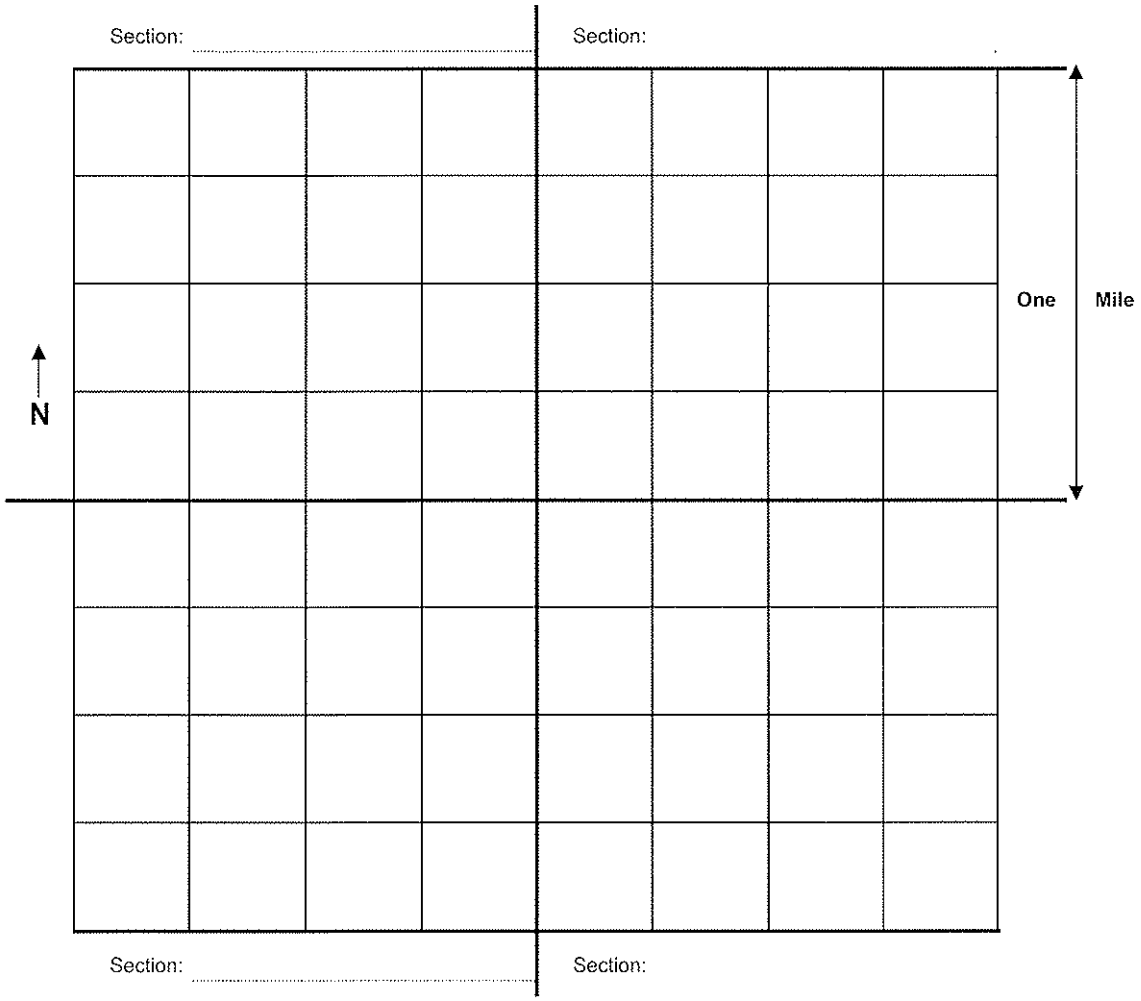
Section(s): .....

Block: ..... Farm Unit: .....

or GPS: .....

County: .....

***PLEASE NOTE:***
*The map is divided into 4 sections with each section divided into quarter-quarter sections. Please complete it by marking the appropriate section number(s) on the map and indicate as accurately as possible the location of the area treated.*




Miscellaneous Information:

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(877) 301-4555

# PESTICIDE APPLICATION RECORD (Version 1)

**NOTE:** This form must be completed same day as the application and it must be retained for 7 years (Ref. chapter 17.21 RCW)

1. Date of Application - Year: 2008 Month: July Day: 29 Start Time: 10 am
   Stop Time: 2:30 pm
2. Name of person for whom the pesticide was applied: King County WLRD
   Firm Name (if applicable):
   Street Address: 201 S. Jackson St Ste 600 City: Sea State: WA Zip: 98104
3. Licensed Applicator's Name (if different from #2 above): Beth Cullen License No.: 166298
   Firm Name (if applicable): Tel No.:
   Street Address: City: State: Zip:
4. Name of person(s) who applied the pesticide (if different from #3 above):
   License No(s). If applicable:
5. Application Crop or Site: Eurasian water milfoil
6. Total Area Treated (acre, sq. ft., etc.): 2 acres
7. Was this application made as a result of a WSDA Permit? ☐ No ☐ Yes (If yes, give Permit No.) #
8. Pesticide Information (please list all information for each pesticide, including adjuvants (buffer, surfactant, etc.), in the tank mix):

| a) Full Product Name | b) EPA Reg. No. | c) Total Amount of Pesticide Applied in Area Treated | d) Pesticide Applied/Acre (or other measure) | e) Concentration Applied |
|---|---|---|---|---|
| Renovate OTF | 67690-42 | 560 lbs | 280 lb / acre | ~~1.75~~ 2.5% |
| | | | / | |
| | | | / | |
| | | | / | |
| | | | / | |

9. Address ***or exact location*** of application. NOTE: If the application is made to one acre or more of agricultural land, the field location must be shown on the map on page two of this form.

10. Wind direction and estimated velocity (mph) during the application: < 3 mph
11. Temperature during the application: ~~75°F~~ 62°F
12. Apparatus license plate number (if applicable):
13. ☐ Air ☐ Ground ☐ Chemigation
14. Miscellaneous Information:

**Location of Application** (If the application covers more than one township or range, please indicate the township & range for the top left section of the map only.

Township: ..... N

Range: ..... ☐ E ☐ W (please indicate)

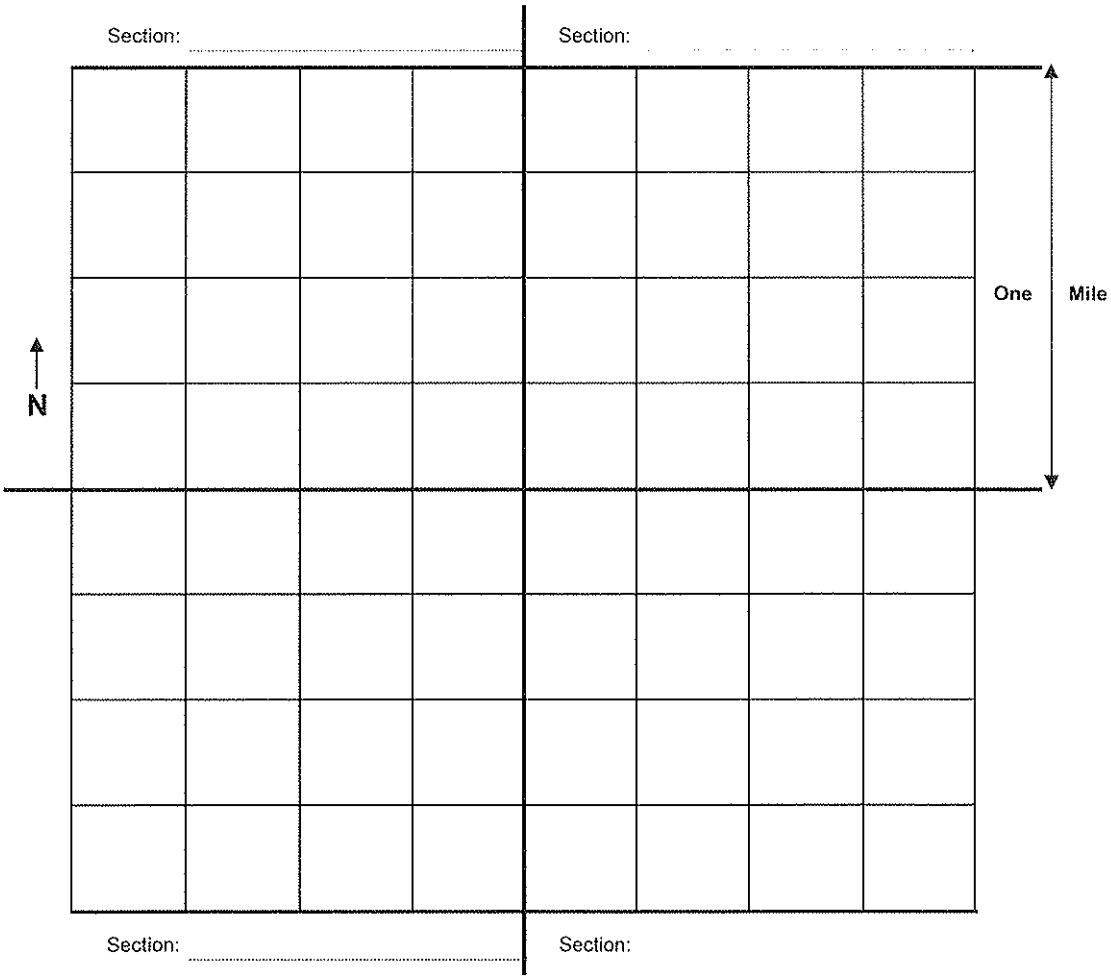
Section(s): .....

Block: ..... Farm Unit: .....

or GPS: .....

County: .....

***PLEASE NOTE:***
*The map is divided into 4 sections with each section divided into quarter-quarter sections. Please complete it by marking the appropriate section number(s) on the map and indicate as accurately as possible the location of the area treated.*




Miscellaneous Information:

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Olympia WA 98504-2560
(877) 301-4555

# PESTICIDE APPLICATION RECORD (Version 1)

**NOTE:** This form must be completed same day as the application and it must be retained for 7 years (Ref. chapter 17.21 RCW)

1. Date of Application - Year: 2009 Month: August Day: 6 Start Time: 11:15
   Stop Time: 12:45
2. Name of person for whom the pesticide was applied: King County WLRD
   Firm Name (if applicable):
   Street Address: 201 S. Jackson St Ste600 City: Sea State: WA Zip: 98104
3. Licensed Applicator's Name (if different from #2 above): Beth Cullen License No.: 66298
   Firm Name (if applicable): same as above Tel No.:
   Street Address: Same as above City: State: Zip:
4. Name of person(s) who applied the pesticide (if different from #3 above): Jenee Colton
   License No(s). If applicable: 78139
5. Application Crop or Site: Cottage Lake Eurasian milfoil
6. Total Area Treated (acre, sq. ft., etc.): 2 acres
7. Was this application made as a result of a WSDA Permit? ☒ No ☐ Yes (If yes, give Permit No.) #
8. Pesticide Information (please list all information for each pesticide, including adjuvants (buffer, surfactant, etc.), in the tank mix):

| a) Full Product Name | b) EPA Reg. No. | c) Total Amount of Pesticide Applied in Area Treated | d) Pesticide Applied/Acre (or other measure) | e) Concentration Applied |
|---|---|---|---|---|
| Renovate OTF | 67690-42 | 320 lbs | 160 lb/ acre | 1.5% |
| | | | / | |
| | | | / | |
| | | | / | |
| | | | / | |

9. Address ***or exact location*** of application. NOTE: If the application is made to one acre or more of agricultural land, the field location must be shown on the map on page two of this form.

10. Wind direction and estimated velocity (mph) during the application: < 2 mph
11. Temperature during the application: 60 °F
12. Apparatus license plate number (if applicable):
13. ☐ Air ☐ Ground ☐ Chemigation
14. Miscellaneous Information:

Washington State Department of Agriculture
Pesticide Management Division
PO Box 42560
Olympia WA 98504-2560
(877) 301-4555

# PESTICIDE APPLICATION RECORD (Version 1)

**NOTE:** This form must be completed same day as the application and it must be retained for 7 years (Ref. chapter 17.21 RCW)

1. Date of Application - Year: 2010 Month: August Day: 16 Start Time: 9:45 am
   Stop Time: 10:45 am
2. Name of person for whom the pesticide was applied: King County and Friends of Cottage Lake
   Firm Name (if applicable):
   Street Address: City: State: Zip:
3. Licensed Applicator's Name (if different from #2 above): Beth Cullen License No.: 66298
   Firm Name (if applicable): King County WLRD Tel No.: (206) 263-6242
   Street Address: 201 S. Jackson St City: Sea State: WA Zip: 98104
4. Name of person(s) who applied the pesticide (if different from #3 above): Chris Knutson
   License No(s). If applicable:
5. Application Crop or Site: Eurasian watermilfoil
6. Total Area Treated (acre, sq. ft., etc.): 2 ACRES
7. Was this application made as a result of a WSDA Permit? ☒ No ☐ Yes (If yes, give Permit No.) #
8. Pesticide Information (please list all information for each pesticide, including adjuvants (buffer, surfactant, etc.), in the tank mix):

| a) Full Product Name | b) EPA Reg. No. | c) Total Amount of Pesticide Applied in Area Treated | d) Pesticide Applied/Acre (or other measure) | e) Concentration Applied |
|---|---|---|---|---|
| Renovate OTF | 67690-42 | 160 lbs | 80 lbs / 1 acre | 1.0 ppm |
| | | | / | |
| | | | / | |
| | | | / | |
| | | | / | |

9. Address ***or exact location*** of application. NOTE: If the application is made to one acre or more of agricultural land, the field location must be shown on the map on page two of this form.

10. Wind direction and estimated velocity (mph) during the application: None
11. Temperature during the application: 86 °F
12. Apparatus license plate number (if applicable):
13. ☐ Air ☒ Ground ☐ Chemigation
    surface application
14. Miscellaneous Information:

**Location of Application** (If the application covers more than one township or range, please indicate the township & range for the top left section of the map only.

Township: ..... N

Range: ..... ☐ E ☐ W (please indicate)

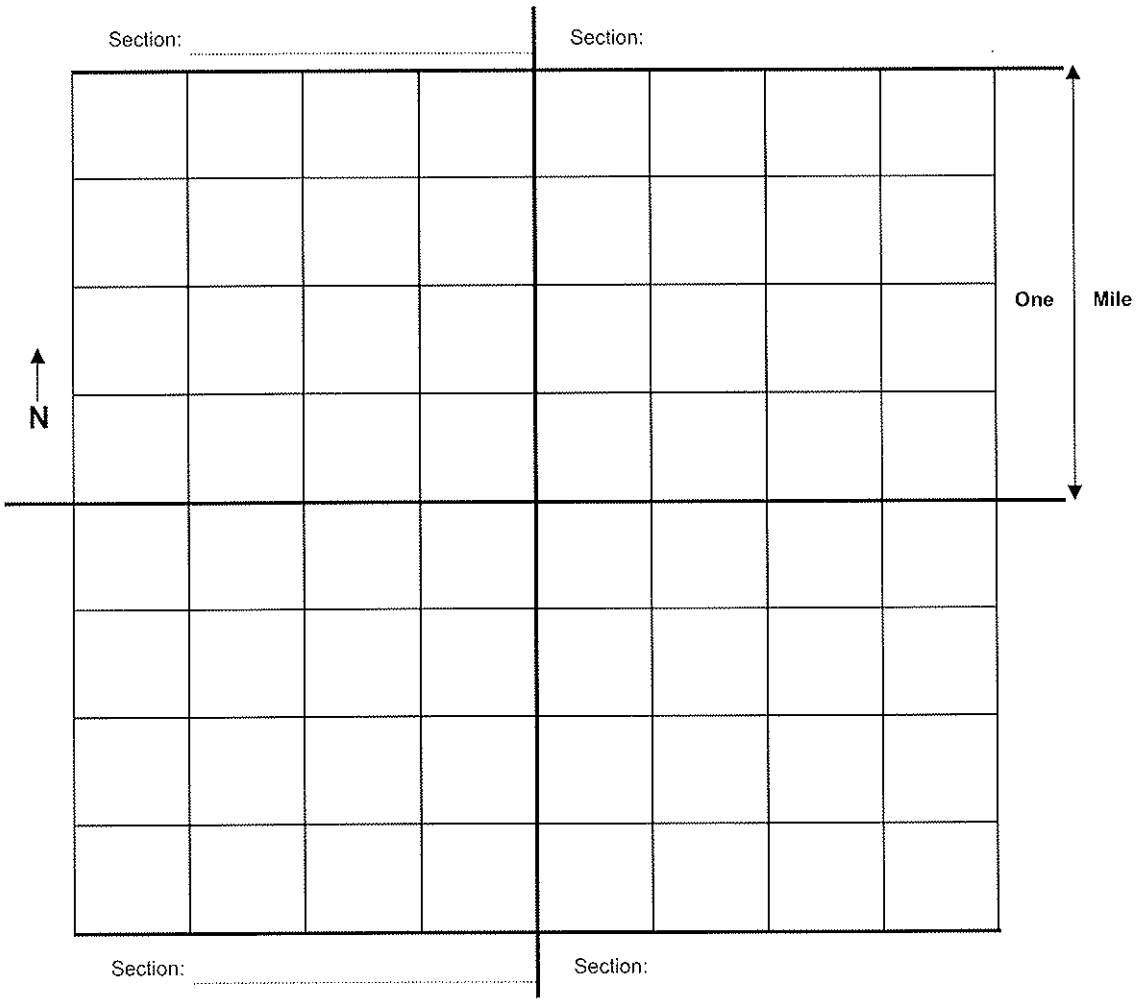
Section(s): .....

Block: ..... Farm Unit: .....

or GPS: .....

County: .....

***PLEASE NOTE:***
*The map is divided into 4 sections with each section divided into quarter-quarter sections. Please complete it by marking the appropriate section number(s) on the map and indicate as accurately as possible the location of the area treated.*




Miscellaneous Information:

# APPENDIX C

# HERBICIDE RESULTS

# FasTEST Results Confidential - Not For Distribution

| | | | |
|---|---|---|---|
| **Cooperator:** | King County DNRP | **Phone:** | **Fax:** |
| Beth Cullen | 201 S. Jackson Suite 600 | (206) 263-6242 | (206) 296-0192 |
| **Territory:** Scott Shuler | Seattle WA 98104- | | |

| Sample | Date(s) Treated | Herbicide | Date Collected | Rate Applied | Acres Treated | Sample Location Description | Results | UOM |
|---|---|---|---|---|---|---|---|---|
| 1. | 07/29/08 | Renovate | 8/6/2008 | 2.5 ppm | .8 | A (south treatment) | .03 | ppm |
| 2. | 07/29/08 | | 8/6/2008 | 2.5 ppm | NA | B (Basseti bridge) | .02 | ppm |
| 3. | | | | | | | | |
| 4. | | | | | | | | |
| 5. | | | | | | | | |
| 6. | | | | | | | | |
| 7. | | | | | | | | |
| 8. | | | | | | | | |
| 9. | | | | | | | | |
| 10. | | | | | | | | |

**Depth Sample Collected:** 1.5 ft

**Date Sample Received:** 8/8/2008

**Storage Conditions:** Analyzed upon receipt

**Condition of Sample(s) Box/Water Containers:** Excellent

**Date Shipped to SePRO:** 8/7/2008

**Date Analysis was Performed:** 8/8/2008

**Run #:** TR0048 **% Control Rec:** 98 **Correlation:** 0.998

**Date Results Sent to Cooperator:** 8/11/2008

**Back of Data Sheet**

**Name of Waterbody:** Cottage Lake

**Average Depth in Feet:** 15

**Back of Data Sheet**

**Size of Waterbody in Acres:** 63

**Target Plant(s) to Control:** Eurasian watermilfoil

# FasTEST Results Confidential - Not For Distribution

| | | | |
|---|---|---|---|
| **Cooperator:** | King County DNRP | **Phone:** | **Fax:** |
| Beth Cullen | 201 S. Jackson Suite 600 | (206) 263-6242 | (206) 296-0192 |
| **Territory:** Scott Shuler | Seattle WA 98104- | | |

| Sample | Date(s) Treated | Herbicide | Date Collected | Rate Applied | Acres Treated | Sample Location Description | Results | UOM |
|---|---|---|---|---|---|---|---|---|
| 1. | 07/29/08 | Renovate 3 | 8/13/2008 | 2.5 ppm | 2.1 | COT A (south end by lilies) | 0.028 | ppm |
| 2. | | | | | | | | |
| 3. | | | | | | | | |
| 4. | | | | | | | | |
| 5. | | | | | | | | |
| 6. | | | | | | | | |
| 7. | | | | | | | | |
| 8. | | | | | | | | |
| 9. | | | | | | | | |
| 10. | | | | | | | | |

**Depth Sample Collected:**

**Storage Conditions:** Analyzed upon receipt

**Date Shipped to SePRO:** 8/13/2008

**Run #:** TR0050 **% Control Rec:** 83 **Correlation:** 0.996

**Date Sample Received:** 8/14/2008

**Condition of Sample(s) Box/Water Containers:** Excellent

**Date Analysis was Performed:** 8/14/2008

**Date Results Sent to Cooperator:** 8/14/2008

**Back of Data Sheet**

**Name of Waterbody:** Cottage Lake

**Average Depth in Feet:** 12

**Back of Data Sheet**

**Size of Waterbody in Acres:** 2.1

**Target Plant(s) to Control:** watermilfoil

# FasTEST Results Confidential - Not For Distribution

| | | | |
|---|---|---|---|
| **Cooperator:** | King County DNRP | **Phone:** | **Fax:** |
| Beth Cullen | 201 S. Jackson Suite 600 | (206) 263-6242 | (206) 296-0192 |
| **Territory:** Scott Shuler | Seattle WA 98104- | | |

| Sample | Date(s) Treated | Herbicide | Date Collected | Rate Applied | Acres Treated | Sample Location Description | Results | UOM |
|---|---|---|---|---|---|---|---|---|
| 1. | 07/29/08 | Renovate 3 | 8/21/2008 | 2.5 ppm | 2.1 | COT 1 | .003 | ppm |
| 2. | | | | | | COT 2 | .003 | ppm |
| 3. | | | | | | COT 3 | .002 | ppm |
| 4. | | | | | | | | |
| 5. | | | | | | | | |
| 6. | | | | | | | | |
| 7. | | | | | | | | |
| 8. | | | | | | | | |
| 9. | | | | | | | | |
| 10. | | | | | | | | |

**Depth Sample Collected:**

**Date Sample Received:** 8/22/2008

**Storage Conditions:** Analyzed upon receipt

**Condition of Sample(s) Box/Water Containers:** Excellent

**Date Shipped to SePRO:** 8/21/2008

**Date Analysis was Performed:** 8/26/2008

**Run #:** TR0054 **% Control Rec:** 103 **Correlation:** 0.999

**Date Results Sent to Cooperator:** 8/26/2008

**Back of Data Sheet**

**Name of Waterbody:** Cottage Lake

**Average Depth in Feet:**

**Back of Data Sheet**

**Size of Waterbody in Acres:** 63

**Target Plant(s) to Control:** Eurasian watermilfoil

# FasTEST Results Confidential - Not For Distribution

| | | | |
|---|---|---|---|
| **Cooperator:** | King County, WLRD | **Phone:** | **Fax:** |
| Beth Cullen | 201 S. Jackson St. STE. 600 | (206) 263-6242 | (206) 296-0192 |
| **Territory:** Scott Shuler | Seattle WA 98104- | | |

| Sample | Date(s) Treated | Herbicide | Date Collected | Rate Applied | Acres Treated | Sample Location Description | Results | UOM |
|---|---|---|---|---|---|---|---|---|
| 1. | 07/29/08 | Renovate 3 | 8/6/2008 | 2.5 ppm | 2.1 | Basetti Bridge | .027 | ppm |
| 2. | | | 8/6/2008 | | | South Treatment | .026 | ppm |
| 3. | | | 8/13/2008 | | | A | .026 | ppm |
| 4. | | | 8/21/2008 | | | 1 | .021 | ppm |
| 5. | | | 8/21/2008 | | | 2 | .021 | ppm |
| 6. | | | 8/21/2008 | | | 3 | .021 | ppm |
| 7. | | | 8/28/2008 | | | A | .019 | ppm |
| 8. | | | 8/28/2008 | | | B | .019 | ppm |
| 9. | | | 8/28/2008 | | | C | .020 | ppm |
| 10. | | | | | | | | |

**Depth Sample Collected:**

**Date Sample Received:** 8/29/2008

**Storage Conditions:** Analyzed upon receipt

**Condition of Sample(s) Box/Water Containers:** Excellent

**Date Shipped to SePRO:** 8/27/2008

**Date Analysis was Performed:** 9/3/2008

**Run #:** TR0057 **% Control Rec:** 93 **Correlation:** 0.998

**Date Results Sent to Cooperator:** 9/3/2008

**Back of Data Sheet**

**Name of Waterbody:** Cottage Lake

**Average Depth in Feet:**

**Back of Data Sheet**

**Size of Waterbody in Acres:** 63

**Target Plant(s) to Control:** Eurasian watermilfoil

# FasTEST Results Confidential - Not For Distribution

| | | | |
|---|---|---|---|
| **Cooperator:** | King County, WLRD | **Phone:** | **Fax:** |
| Beth Cullen | 201 S. Jackson St. STE. 600 | (206) 263-6242 | (206) 296-0192 |
| **Territory:** Scott Shuler | Seattle WA 98104- | | |

| Sample | Date(s) Treated | Herbicide | Date Collected | Rate Applied | Acres Treated | Sample Location Description | Results | UOM |
|---|---|---|---|---|---|---|---|---|
| 1. | 07/29/08 | Renovate 3 | 9/10/2008 | 2.5 ppm | 2.1 | COT A edge of lilies | .018 | ppm |
| 2. | | | | | | COT B off public dock | .019 | ppm |
| 3. | | | | | | | | |
| 4. | | | | | | | | |
| 5. | | | | | | | | |
| 6. | | | | | | | | |
| 7. | | | | | | | | |
| 8. | | | | | | | | |
| 9. | | | | | | | | |
| 10. | | | | | | | | |

**Depth Sample Collected:** 0.5 M

**Date Sample Received:** 9/11/2008

**Storage Conditions:** Analyzed upon receipt

**Condition of Sample(s) Box/Water Containers:** Excellent

**Date Shipped to SePRO:** 9/10/2008

**Date Analysis was Performed:** 9/12/2008

**Run #:** TR0058 **% Control Rec:** 93 **Correlation:** 0.997

**Date Results Sent to Cooperator:** 9/12/2008

**Back of Data Sheet**

**Name of Waterbody:** Cottage Lake

**Average Depth in Feet:** 4.5

**Back of Data Sheet**

**Size of Waterbody in Acres:** 63

**Target Plant(s) to Control:** Eurasian watermilfoil

# FasTEST Results Confidential - Not For Distribution

**Cooperator:** Beth Cullen

King County
201 S. Jackson St. STE 600
Seattle | WA | 98104-

**Phone:** (206) 263-6242

**Fax:**

**Territory:** Scott Shuler

| Sample | Date(s) Treated | Herbicide | Date Collected | Rate Applied | Acres Treated | Sample Location Description | Results | UOM |
|---|---|---|---|---|---|---|---|---|
| 1. | 07/29/08 | Renovate 3 | 10/13/2008 | 2.5 ppm | 2.1 | COT C public dock | .014 | ppm |
| 2. | | | | | | COT B Basetti Bridge | .009 | ppm |
| 3. | | | | | | | | |
| 4. | | | | | | | | |
| 5. | | | | | | | | |
| 6. | | | | | | | | |
| 7. | | | | | | | | |
| 8. | | | | | | | | |
| 9. | | | | | | | | |
| 10. | | | | | | | | |

**Depth Sample Collected:**

**Date Sample Received:**

**Storage Conditions:**

**Condition of Sample(s) Box/Water Containers:**

**Date Shipped to SePRO:**

**Date Analysis was Performed:**

**Run #:** TR0061 **% Control Rec:** 99 **Correlation:** 0.997

**Date Results Sent to Cooperator:**

**Back of Data Sheet**

**Name of Waterbody:** Cottage Lake

**Average Depth in Feet:**

**Back of Data Sheet**

**Size of Waterbody in Acres:** 60

**Target Plant(s) to Control:** Eurasian watermilfoil

# FasTEST Results Confidential - Not For Distribution

| | | | |
|---|---|---|---|
| **Cooperator:** | King County WLRD | **Phone:** | **Fax:** |
| Beth Cullen | 201 S. Jackson St. Ste. 600 | (206) 263-6242 | |
| **Territory:** Scott Shuler | Seattle WA 98104- | | |

| Sample | Date(s) Treated | Herbicide | Date Collected | Rate Applied | Acres Treated | Sample Location Description | Results | UOM |
|---|---|---|---|---|---|---|---|---|
| 1. | 08/06/09 | Renovate | 8/19/2009 | 160 lb/AC | 2 | Cot A1 | 0.012 | ppm |
| 2. | | | | | | Cot D | 0.011 | ppm |
| 3. | | | | | | | | |
| 4. | | | | | | | | |
| 5. | | | | | | | | |
| 6. | | | | | | | | |
| 7. | | | | | | | | |
| 8. | | | | | | | | |
| 9. | | | | | | | | |
| 10. | | | | | | | | |

**Depth Sample Collected:** 1 ft

**Date Sample Received:** 8/21/2009

**Storage Conditions:** Analyzed upon receipt

**Condition of Sample(s) Box/Water Containers:** Excellent

**Date Shipped to SePRO:** 8/20/2009

**Date Analysis was Performed:** 8/21/2009

**Run #:** TR0156 **% Control Rec:** 106 **Correlation:** 0.997

**Date Results Sent to Cooperator:** 8/21/2009

**Back of Data Sheet**

**Name of Waterbody:** Cottage Lake

**Average Depth in Feet:** 4

**Back of Data Sheet**

**Size of Waterbody in Acres:** 63

**Target Plant(s) to Control:** Eurasian watermilfoil

# FasTEST Results Confidential - Not For Distribution

| | | | |
|---|---|---|---|
| **Cooperator:** | King County, WLRD | **Phone:** | **Fax:** |
| Beth Cullen | 201 S. Jackson St., Ste 600 | (206) 263-6242 | |
| **Territory:** Scott Shuler | Seattle WA 98104- | | |

| Sample | Date(s) Treated | Herbicide | Date Collected | Rate Applied | Acres Treated | Sample Location Description | Results | UOM |
|---|---|---|---|---|---|---|---|---|
| 1. | 08/06/09 | Renovate 3 | 9/2/2009 | 160lb/ac | 2ac | south edge of lilies | 0.012 | ppm |
| 2. | 08/06/09 | Renovate 3 | 9/2/2009 | 160lb/ac | 2ac | public dock | 0.010 | ppm |
| 3. | | | | | | | | |
| 4. | | | | | | | | |
| 5. | | | | | | | | |
| 6. | | | | | | | | |
| 7. | | | | | | | | |
| 8. | | | | | | | | |
| 9. | | | | | | | | |
| 10. | | | | | | | | |

**Depth Sample Collected:**

**Date Sample Received:** 9/4/2009

**Storage Conditions:** Refrigerated

**Condition of Sample(s) Box/Water Containers:** Excellent excellent

**Date Shipped to SePRO:** 9/3/2009

**Date Analysis was Performed:** 9/8/2009

**Run #:** TR0163E **% Control Rec:** 98 **Correlation:** 0.998

**Date Results Sent to Cooperator:** 9/8/2009

**Back of Data Sheet**

**Name of Waterbody:** Cottage Lake

**Average Depth in Feet:** 0

**Back of Data Sheet**

**Size of Waterbody in Acres:** 63

**Target Plant(s) to Control:** Eurasian watermilfoil

SRTC SePRO Research & Technology Campus

# Chain of Custody 790BA581-7

| Customer Company | | Customer Contact | |
|---|---|---|---|
| Company Name: | King County WRLD | Contact Person: | Beth |
| Address: | 201 S. Jackson St. Ste. 600 | E-mail Address: | beth.cullen@kingcounty.gov |
| City: | Seattle | Phone: | |
| State: | WA 98104 | Fax: | |

## Payment Information

| | | | |
|---|---|---|---|
| Payment Type: | PO Number | Card Number/Expiration Num: | 68382 |

## Waterbody Information

| | | | |
|---|---|---|---|
| Waterbody: | Cottage Lake | Waterbody Size (acres): | 63.00 |
| Depth Average: | 6.00 | | |
| Target Plants | Eurasian Watermilfoil, | | |

## Sample Information

| Sample Site ID | Date Treated | Date Sample Collected | Sample Location | Products | Acres Treated | Rate | Active | Result |
|---|---|---|---|---|---|---|---|---|
| COT C | 08/16/2010 | 08/30/2010 | public dock | Renovate OTF | 2 | 1 | Triclopyr | **0.011 ppm** |
| COT D | 08/16/2010 | 08/30/2010 | Morrison dock | Renovate OTF | 2 | 1 | Triclopyr | **0.011 ppm** |

## Laboratory Information

| | | | |
|---|---|---|---|
| Date Received: | 9/2/2010 | Date Analysis Performed: | 9/7/2010 |
| Date Results Sent: | 9/7/2010 | Storage Conditions | Analyzed Immediately |